NAVSHIPS 0967-239-4040 (Non-Registered)

REFERENCE STANDARDS BOOK

for

TELEGRAPH TERMINAL

AN/UCC-1D(V)

SERIAL_____

DEPARTMENT OF THE NAVY

NAVAL SHIP SYSTEMS COMMAND

REFERENCE STANDARDS SUMMARY

Serial No. _____

Installed in (Ship or Station) _____

After Telegraph Terminal AN/UCC-1D(V) has been brought up to optimum performance and the standards accomplished, record on this summary sheet the test indications which have been obtained. Retain this sheet in the book unless called for by the Naval Ship Systems Command.

Step No.	Ref. No.	Ref. Standard
	Section A	
1	(1W)	_____ vdc
2	(2W)	_____ vdc
3	(3W)	_____ vdc
4	(4W)	_____ ma
5	(5W)	Mark _____ ms Space _____ ms
6	(1M)	_____ dbm
	Section B	
7	(6W)	_____ vdc
8	(2M)	_____ dbm
	Section C	
9	(7W)	_____ vdc
10	(8W)	_____ ma
11	(3M)	_____ vrms
12	(4M)	_____ ms _____ ms
	Section D	
13	(1SA)	_____ ma
14	(2SA)	_____ vdc
15	(3SA)	_____ vdc
16	(4SA)	_____ vdc
17	(5SA)	_____ vrms
18	(6SA)	Mark _____ ms Space _____ ms
19	(7SA)	Mark _____ ms Space _____ ms
20	(8SA)	425 Mark _____ cps Space _____ cps
		595 Mark _____ cps Space _____ cps
		765 Mark _____ cps Space _____ cps
		935 Mark _____ cps Space _____ cps

Step No.	Ref. No.	Ref. Standard
20	(8SA)	1105 Mark _____ cps Space _____ cps
		1275 Mark _____ cps Space _____ cps
		1445 Mark _____ cps Space _____ cps
		1615 Mark _____ cps Space _____ cps
		1785 Mark _____ cps Space _____ cps
		1955 Mark _____ cps Space _____ cps
		2125 Mark _____ cps Space _____ cps
		2295 Mark _____ cps Space _____ cps
		2465 Mark _____ cps Space _____ cps
		2635 Mark _____ cps Space _____ cps
		2805 Mark _____ cps Space _____ cps
		2975 Mark _____ cps Space _____ cps
		1955 Mark _____ cps Space _____ cps
		2380 Mark _____ cps Space _____ cps
		2805 Mark _____ cps Space _____ cps
		3230 Mark _____ cps Space _____ cps

List all Field changes which have been accomplished on this equipment _____

Maint. Stds. Performed by _____ Date _____

Approved by _____ Title-Position _____

Activity _____

UNCLASSIFIED

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REFERENCE STANDARDS BOOK

for

TELEGRAPH TERMINAL

AN/UCC-1D(V)

SERIAL _____

DEPARTMENT OF THE NAVY

NAVAL SHIP SYSTEMS COMMAND

UNCLASSIFIED

Approved: 27 April 1967

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page			
ii to vi	Original		
1-1 to 1-2	Original		
2-1 to 2-5	Original		

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REVISIONS

(Field changes considered in preparation of this book: None)

CHANGE NO.	FLD. CHGS. CONSIDERED	STEPS AFFECTED	EFFECT IF FIELD CHANGE IS NOT ACCOMPLISHED	DATE ENTERED

INTRODUCTION

NOTE: If a ship cannot obtain a copy of the Reference Standards Book at the time of installation or major overhaul, and the industrial activity has a library copy on hand, the library copy shall be used to accomplish the required measurements, and locally reproduced summary sheets may be used to record the results. When this procedure is followed, a copy of the required Reference Standards Book shall be requisitioned for the ship, and a complete summary sheet shall be provided the ship (in addition to the copy for the Naval Ship Systems Command), together with written instructions to record the reference standards in the proper locations in the book and to insert the summary sheet at the front of the book as the official record of accomplishment.

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GENERAL

This Reference Standards Book is to be assigned permanently to the specific installation of Telegraph Terminal AN/UCC-1D(V) indicated on the cover and title page.

Because of the variable configuration of Telegraph Terminal AN/UCC-1D(V), one set of time estimates (time required to perform POMSEE) cannot be accurate for all configurations. The time estimates included in this book cover a terminal consisting of one Cabinet, Electrical Equipment CY-4639A/UCC-1C(V) containing one Control-Attenuator C-6554A/UCC-1C(V), four Keyers, Frequency Shift KY-558A(P)/UCC-1C(V), and four Converters, Frequency Shift CV-1920A(P)/UCC-1C(V). The time required by a Cabinet containing eight Keyers or eight Converters is very nearly the same as that required by this Cabinet. When a Telegraph Terminal consists of more than one Cabinet, the time required (with the exception of that required for Section D) should be multiplied by the number of Cabinets. Only one Test Set, Telegraph TS-2232A/UCC-1C(V), Section D, is furnished for each installation. The serial number of the Cabinet should be entered on the cover and title page. One Reference Standards Book is furnished for each Cabinet.

The tests prescribed herein provide a systematic and efficient method of checking and performing routine preventive maintenance on the above equipment. This book contains specific test procedures which, when accomplished on the above equipment when it is operating properly, will provide a series of reference standards representing proper performance of the specified equipment. It also contains a series of periodic maintenance check-off procedures which, when performed as directed, will detect areas of subnormal performance. Comparison of preventive-maintenance results with the reference standards, and proper analysis and correction of any abnormal results, will serve to avert impending equipment failure.

The book is divided into two parts: Part I - Tests for Establishing Reference Standards, and Part II - Preventive Maintenance Check-Off. Part I contains a block diagram showing functional sections, a list of tests which, when performed and recorded, will provide the reference standards for the assigned equipment, and the procedures necessary for accomplishing these tests. Collectively, these reference standards indicate the equipment capability. Because of the variable configuration of the Telegraph Terminal, because Keyer and Converter modules operate automatically and independently, and because each module contains its own d-c power supply circuits, there is very little interaction among functional sections shown in the block diagram.

Part II contains a series of preventive-maintenance tests and procedures (with necessary instructions) arranged by time periods. When properly performed, these tests and procedures indicate the performance of individual circuits and also provide for systematic preventive maintenance of the equipment. All procedures designated by step numbers enclosed in stars (① , ② , etc.) are referred to in the Performance Standards Sheet for this equipment. The performance standard sheet for this equipment is contained in NAVSHIPS 93000.

The test equipments and times required to perform the tests are listed on vi.

Part I - Tests for Establishing Reference Standards

The maintenance standards tests are given in the "List of Maintenance Standards Procedures" on page 1-1. These tests are divided into functional sections which agree with the functional sections of the block diagram on page 1-2. The procedures for performing each step are located throughout Part I and Part II, and are referred to in the list.

Part II - Preventive Maintenance Check-Off

Part II of the book contains test procedures in table form (procedure table), to be performed by the maintenance technician or operator; these procedures are scheduled for regular periods (weekly, monthly, etc.).

Those tests that are designated "O. M." may be performed as part of the Operational Maintenance program by operating personnel. At the top of each procedure table is a list of operating conditions and control settings which apply to the entire table unless noted otherwise in the procedures of a given step.

INSTRUCTIONS

Upon receipt of this book, record in ink, in the space provided on both the cover and the title page, the serial number, and if applicable, the model number of the equipment to which this book is assigned.

Enter field changes that have been made to the equipment that alter any of the steps of the book on page iii. The steps affected may be changed, in ink, on the applicable pages, so as to provide maintenance (or operating) personnel with an accurate method for testing the equipment. These entries should be followed by the initials of the person who made the field change, or, if unknown, by the initials of the person making the entry.

Establish the Reference Standards upon receipt of this book, and re-establish them after equipment overhaul. Prior to establishing the initial reference standards, the equipment shall first be checked to insure that the equipment is operating within its design capabilities. After it has been ascertained that the equipment is operating properly, the prescribed tests listed in Part I (page 1-1) shall be made, and the results recorded in ink in the spaces provided in the procedure tables for the appropriate steps. Care must be taken to follow the instructions given for each maintenance standard so that the reference standard obtained provides for a valid comparison when the preventive-maintenance values are subsequently compared with it. Ship's own test equipment shall be used for establishing the original reference standards.

Upon completion and entry of the reference standards, these standards are to be transcribed onto the Reference Standards Summary Sheet contained in the front of the book. Retain this page in the book.

After the maintenance standards tests have been completed and the results properly entered, the book is to be used to augment the preventive-maintenance schedule. Because of the high reliability of this equipment, no checks have been prescribed more often than weekly. It is recommended that the equipment be energized weekly for the purpose of making these checks.

IN-PORT PROCEDURES: The equipment should be energized for the purpose of making weekly checks.

FIELD CHANGES: Any information concerning field changes that are made on the equipment subsequent to the recording of the reference standards must be entered on page iii by the person making the field change; this entry should be followed with his initials. If the field change should require a change in any of the steps in this book, correct the book in accordance with instructions in the applicable temporary correction or permanent change. When the affected step is a maintenance standard, a new reference standard should be obtained and entered. All field changes entered in this book shall be transcribed in the replacement book.

TEST EQUIPMENT (OR EQUIVALENT) TO BE USED

TEST EQUIPMENT	PART I - SECTION				PART II - PERIOD		
	A	B	C	D	W	M	S-A
Test Set Telegraph TS-2232A/UCC-1C(V)	X	X	X		X	X	
Electronic Multimeter ME-6D/U			X			X	
Oscilloscope AN/USM-117	X		X		X	X	
Differential Voltmeter Fluke Model 825A-G				X			X
Regulated Power Supply Hewlett-Packard Model 721A				X			X
Audio Oscillator AN/URM-127				X			X
Frequency Meter AN/USM-207				X			X

ESTIMATED TIME REQUIRED TO PERFORM POMSEE

PART I	
SECTION	TIME REQ'D
A	44 min
B	2 min
C	48 min
D	65 min
TOTAL	2 hr 39 min

PART II	
PERIODIC CHECKS	ESTIMATED TIME REQ'D
Weekly	13 min
Monthly	12 min
Semi-Annual	65 min
TOTAL REQ'D Per Quarter	13 hr 22 min
Average Per Day	9 min

SPECIAL PROCEDURES AND ADJUSTMENTS

1. PLACING THE EQUIPMENT IN OPERATION FOR TESTS

When the instructions in the Operating Conditions and Control Settings call for the equipment to be placed in full operation, the power switch on each module should be turned on. The power switch of each module is a center-off toggle switch. It is marked 115V/230V. A locking guard is positioned at installation to prevent setting it to the wrong position. When the power switch on the Control-Attenuator module is turned on, the MAIN POWER indicator will light. Only a few seconds are required for the equipment to warm up and for the circuits to stabilize.

NOTE: Before plugging the test cable of the Test Set into the TEST connector of a module, make sure that the FUNCTION SELECTOR switch of the Test Set is in the correct position. If it is in the wrong position, signals from the Test Set will interrupt the operation of the Telegraph Terminal.

2. ADJUSTMENT INFORMATION

All instructions for adjustment of Telegraph Terminal AN/UCC-1D(V) are contained in the Technical Manual.

PART I - TESTS FOR ESTABLISHING REFERENCE STANDARDS

LIST OF MAINTENANCE STANDARDS

The tests listed below are the maintenance standards test for Telegraph Terminal AN/UCC-1D(V). Information regarding the intent and accomplishment of these tests is given on page iv. The tests are subdivided by functional group; each group is designated by a letter (A, B, C, etc.) which agrees with the letter identifications on the block diagram, page 1-2. The test equipment required for performing the maintenance standards tests for each section is listed on page vi.

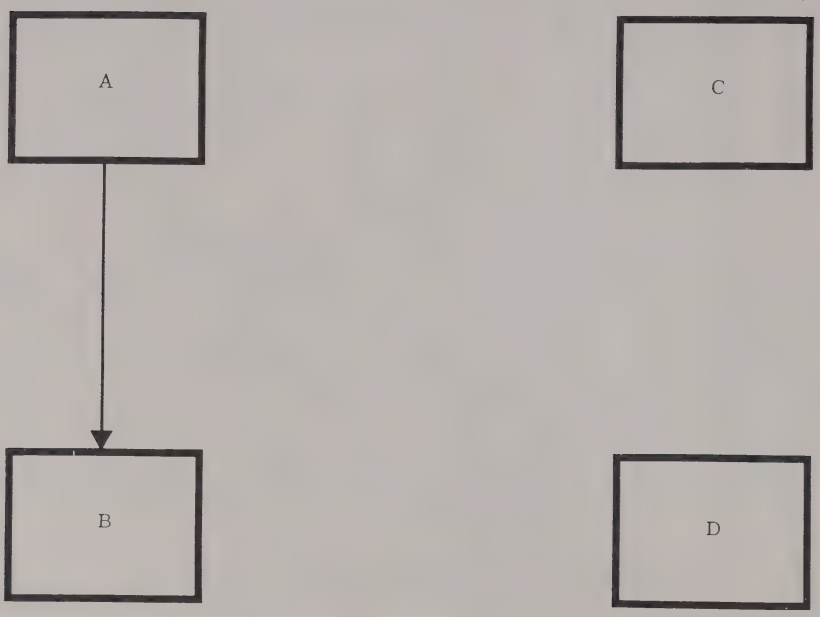
SECTION	STEP	ACTION REQUIRED	REFER TO PERIOD	REFER TO STEP	REFER TO PAGE
A KEYER	(1)	Record Keyer +12V power supply voltage.	W	(1)	2-1
	(2)	Record Keyer -6.8V power supply voltage.	W	(2)	2-1
	(3)	Record Keyer +3V power supply voltage.	W	(3)	2-1
	⑤	Record Keyer d-c loop current.	W	⑤	2-1
	⑤	Record Keyer symmetry waveform.	W	⑤	2-1
	⑥	Record Keyer tone output level.	M	①	2-2
B CONTROL ATTENUATOR	(7)	Record Control-Attenuator +12V power supply voltage.	W	(6)	2-1
	⑧	Record Control-Attenuator tone output level.	M	②	2-2
C CONVERTER	(9)	Record Converter +12V power supply voltage.	W	(7)	2-1
	⑩	Record Converter d-c loop current.	W	⑧	2-1
	⑪	Record AGC voltage.	M	③	2-2
	⑫	Record discriminator balance voltages.	M	④	2-2
D TEST SET	⑬	Record meter loop-current reading with an accurate input of 4.9 volts.	SA	①	2-3
	⑭	Record meter reading when measuring +12V power supply voltage.	SA	②	2-3
	⑮	Record meter reading when measuring +3V power supply voltage.	SA	③	2-3
	⑯	Record meter reading when measuring -6.8V power supply voltage.	SA	④	2-3
	⑰	Record rms voltage required to produce a reading of zero dbm on the Test Set meter.	SA	⑤	2-3
	(18)	Record 150 baud reversals waveform.	SA	(6)	2-4
	(19)	Record 75 baud reversals waveform.	SA	(7)	2-4
	(20)	Record frequency of mark and space tones for each channel.	SA	(8)	2-4

NOTE: The Naval Ship Systems Command requirement for Part II of this book is cancelled when the Electronics Planned Maintenance System is implemented for this equipment.

Maint. Stds. Performed by_____ Date_____
Approved by_____ Title-Position_____
Activity_____

UNIT

FUNCTIONAL BLOCK DIAGRAM



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FUNCTIONAL SECTIONS

Section A - Keyers
Section B - Control-Attenuator
Section C - Converters
Section D - Test Set

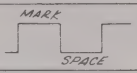
PART II - PREVENTIVE MAINTENANCE CHECK-OFF

Operating Conditions and Control Settings:

AN/UCC-1D(V) in full operation

Preliminary Procedure:

Set FUNCTION SELECTOR switch of Test Set to +12V and plug test cable of Test Set into TEST connector of the Keyer. Set the READ/IND. switch of the Test Set to IND. for weekly check or to READ for establishing reference standards.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(1)	Record Keyer +12V power supply voltage.	TS-2232A/UCC-1C(V)	+10.8 to +13.2 vdc
OM	PROCEDURE: Read indication on meter.		
(2)	Record Keyer -6.8V power supply voltage.	TS-2232A/UCC-1C(V)	-6.1 to -7.5 vdc
OM	PROCEDURE: Turn FUNCTION SELECTOR to -6.8V and read meter.		
(3)	Record Keyer +3V power supply voltage.	TS-2232A/UCC-1C(V)	+2.7 to +3.5 vdc
OM	PROCEDURE: Turn FUNCTION SELECTOR to +3V and read meter.		
(4)	Record Keyer d-c loop current.	TS-2232A/UCC-1C(V)	55 to 65 ma*
OM	PROCEDURE: Turn FUNCTION SELECTOR to LOOP CUR. and read meter.		
(5)	Record Keyer symmetry waveform	AN/USM-117	
	PROCEDURE: Set MODE SELECTOR switch on Test Set to desired baud rate and FUNCTION SELECTOR switch to REV OUT. Center the trace of the AN/USM-117 at zero amplitude, connect the ground lead of the oscilloscope to the TEST SET GND jack, and connect the signal lead to the SYM jack. Observe that the mark time of the waveform is equal to the space time. NOTE: D-C loop must be turned off.		
(6)	Record Control-Attenuator +12V power supply voltage.	TS-2232A/UCC-1C(V)	+10.8 to +13.2 vdc
OM	PROCEDURE: Read indication on meter.		
(7)	Record Converter +12V power supply voltage.	TS-2232A/UCC-1C(V)	+10.8 to +13.2 vdc
OM	PROCEDURE: Read indication on meter.		
(8)	Record Converter d-c loop current	TS-2232A UCC-1C(V)	55 to 65 ma
OM	PROCEDURE: Transmit a steady mark to the Converter, turn FUNCTION SELECTOR to LOOP CUR., and read meter.		

*Obtained when Keyer is transmitting a steady mark (neutral keying) only.

Steps (1) thru (4)

Operating Conditions and Control Settings:

AN/UCC-1D(V) in full operation

Preliminary Procedure:

Set FUNCTION SELECTOR switch of Test Set to TONE IN and plug test cable into TEST connector of the Keyer. Set READ IND. switch to READ.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(1)	Record Keyer tone output level.	TS-2232A/UCC-1C(V)	0 dbm
	PROCEDURE: Read indication on meter.		
(2)	Record Control-Attenuator tone output level.	TS-2232A/UCC-1C(V)	0 dbm
	PROCEDURE: Move test cable to TEST connector of Control-Attenuator and read indication on meter.		

Preliminary Procedure:

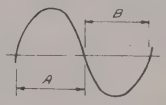
Adjust the signal input to the Converter (output of the communications link) to zero dbm.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(3)	Record AGC voltage.	ME-6D/U	0.9 to 1.2 vrms
	PROCEDURE: Connect the ground binding post of the voltmeter to the COM test point and the signal lead to the AGC test point. Read the voltage indicated on the meter.		

Preliminary Procedure:

Connect the common and signal leads of the AN/USM-117 together and set the controls so the trace is continually visible (free running). Set the vertical amplifier for d-c amplification and adjust the vertical position control to place the trace in the exact center of the graticule. Set the AN/USM-117 for internal synchronization. Connect the common lead of the AN/USM-117 to test point DISC B (pin K) and the signal lead to test point DISC A (pin H) of the TEST connector on the Converter. Transmit a dot cycle to the Converter from the opposite end of the communication link.

NOTE: D-C loop must be turned off.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(4)	Observe discriminator balance waveform and record time durations of positive and negative voltages above and below 0 volt reference line	AN/USM-117	
	PROCEDURE: Observe time duration of positive and negative excursions and record.		

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Operating Conditions and Control Settings:

Test Set TS-2232A/UCC-1C(V) energized and operating; FUNCTION SELECTOR set to LOOP CUR., and READ/IND. switch set to READ.

Preliminary Procedure:

Connect precision power supply (Hewlett-Packard Model 721A or equivalent) and differential voltmeter (Fluke Model 825A-G or equivalent) to supply test voltage with an accuracy of plus or minus one percent.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
1	Record meter loop current indication with accurate input of 4.9 volts (loop current).	TS-2232A/UCC-1C(V) meter	55 ma to 65 ma
	PROCEDURE: Connect positive lead of power supply to pin A of test cable plug and negative lead of power supply to pin C of test cable plug. Adjust power supply output to 4.9 volts and read Test Set meter.		
2	Record meter reading when measuring +12V power supply voltage.	TS-2232A/UCC-1C(V) meter	+11 to +13 vdc
	PROCEDURE: Move positive lead of power supply to pin D of test cable plug and negative lead to pin P. Adjust power supply output to 12 volts; set FUNCTION SELECTOR to +12V; and read Test Set meter.		
3	Record meter reading when measuring +3V power supply voltage	TS-2232A/UCC-1C(V) meter	+2.5 to +3.5 vdc
	PROCEDURE: Move positive lead of power supply to pin B of test cable plug (negative lead remains on pin P). Adjust power supply output to 3 volts; set FUNCTION SELECTOR to +12V; and read Test Set meter.		
4	Record meter reading when measuring -6.8V power supply voltage.	TS-2232A/UCC-1C(V) meter	-6.3 to -7.5 vdc
	PROCEDURE: Move negative lead of power supply pin F of test cable plug and positive lead of power supply to pin P of test cable plug. Adjust power supply output to 6.8 volts; set FUNCTION SELECTOR to -6.8V; and read Test Set meter.		

Operating Conditions and Control Settings:

Test Set TS-2232A UCC-1C(V) energized and operating; FUNCTION SELECTOR set to TONE IN. and READ/IND. switch set to READ.

Preliminary Procedure:

Connect ME-6D/U to measure amplitude of audio oscillator output. Connect one lead of the audio oscillator to pin N of the test cable plug and connect the other lead to pin L of the test cable plug.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
5	Record rms voltage required to produce a reading of 0 dbm on the Test Set meter.	ME-6D/U	0.69 to 0.87 vrms
	PROCEDURE: Adjust audio oscillator to 3000 cps. Adjust amplitude of audio oscillator output to produce a meter reading of zero dbm on Test Set meter. Read voltage indication on ME-6D/U.		

Steps (6) thru (8)

Operating Instructions and Control Settings:

Test Set TS-2232A/UCC-1C(V) energized and operating; FUNCTION SELECTOR set to REV. OUT.

Preliminary Procedure:

Connect the ground terminal of the oscilloscope to pin P of the test cable plug and the signal lead to pin A.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(6)	Record 150 baud reversals waveform.	AN/USM-117	6.0 to 7.5 msec
	PROCEDURE: Set MODE SELECTOR to 150 BAUD and observe oscilloscope display.		
(7)	Record 75 baud reversals waveform.	AN/USM-117	12.5 to 16.6 msec
	PROCEDURE: Set MODE SELECTOR to 75 BAUD and observe oscilloscope display.		

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Operating Instructions and Control Settings:

Test Set TS-2232A/UCC-1C(V)energized and operating; FUNCTION SELECTOR set to TONE OUT; MODE SELECTOR set to SPACE; TONE SELECTOR set to 425.

Preliminary Procedure:

Connect ground terminal of frequency counter to pin P of the test cable plug and connect the input lead of the frequency counter to pin M.

STEP NO.	ACTION REQUIRED	READ INDICATION ON	REFERENCE STANDARD
(8)	Check frequency of mark and space tones for each channel.	Frequency counter	See chart (page 2-5)
	PROCEDURE: Read frequency counter and check against reference standard below. Set MODE SELECTOR to MARK, read frequency counter, and check frequency. Advance TONE SELECTOR to next position, check frequency and return MODE SELECTOR to SPACE. Continue to measure and check mark and space frequencies for each channel until all channels have been measured.		

STEP NUMBER (8)		REFERENCE STANDARD
425	Mark	464.5 to 470.5 cps
	Space	379.5 to 385.5 cps
595	Mark	634.5 to 640.5 cps
	Space	549.5 to 555.5 cps
765	Mark	804.5 to 810.5 cps
	Space	719.5 to 725.5 cps
935	Mark	974.5 to 980.5 cps
	Space	889.5 to 895.5 cps
1105	Mark	1144.5 to 1150.5 cps
	Space	1059.5 to 1065.5 cps
1275	Mark	1314.5 to 1320.5 cps
	Space	1229.5 to 1235.5 cps
1445	Mark	1484.5 to 1490.5 cps
	Space	1399.5 to 1405.5 cps
1615	Mark	1654.5 to 1660.5 cps
	Space	1569.5 to 1575.5 cps
1785	Mark	1824.5 to 1830.5 cps
	Space	1739.5 to 1745.5 cps
1955	Mark	1994.5 to 2000.5 cps
	Space	1909.5 to 1915.5 cps

STEP NUMBER (8)		REFERENCE STANDARD
2125	Mark	2164.5 to 2170.5 cps
	Space	2079.5 to 2085.5 cps
2295	Mark	2334.5 to 2340.5 cps
	Space	2249.5 to 2255.5 cps
2465	Mark	2504.5 to 2510.5 cps
	Space	2419.5 to 2425.5 cps
2635	Mark	2674.5 to 2680.5 cps
	Space	2589.5 to 2595.5 cps
2805	Mark	2844.5 to 2850.5 cps
	Space	2759.5 to 2765.5 cps
2975	Mark	3014.5 to 3020.5 cps
	Space	2929.5 to 2935.5 cps
1955	Mark	2037 to 2043 cps
	Space	1867 to 1873 cps
2380	Mark	2462 to 2468 cps
	Space	2292 to 2298 cps
2805	Mark	2887 to 2893 cps
	Space	2717 to 2723 cps
3230	Mark	3312 to 3318 cps
	Space	3142 to 3148 cps

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